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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/070,104	10/03/2002	Jun Akedo	KNI-162-A	9552

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CARRIER BLACKMAN AND ASSOCIATES  
24101 NOVI ROAD  
SUITE 100  
NOVI, MI 48375

EXAMINER
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BLACKWELL RUDASIL, GWENDOLYN A

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 06/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/070,104

Applicant(s)

AKEDO ET AL.

Examiner

Gwendolyn Blackwell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2005.  
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-10 and 73-78 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-6, 8-10 and 73-78 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 19 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Arguments***

1. Upon further consideration, the indication of allowable subject matter regarding “wherein elements other than main elements forming the crystals do not segregate on the boundary face of the crystals forming the structure” and “the average crystallite size of the formed structure is 50 nm or less and the compactness thereof is 99% or more” has been withdrawn for the reasons set forth below.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

*The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.*

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase “wherein elements other than main elements forming the crystals do not segregate on the boundary face of the crystals forming the structure” renders the claim unclear. What does the phrase mean?

### ***Examiner's Comments***

4. The limitation of claim 1 that requires “wherein elements other than main elements forming the crystals do not segregate on the boundary face of the crystals forming the structure”,

does not seem to be supported by the specification. It is requested that Applicant supply, using page and line number, the location in the specification where the aforementioned can be located.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

*(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.*

6. Claims 1-5, 10, 73-74, and 78 are rejected under 35 U.S.C. 102(e) as being anticipated by United States Patent no. 6,280,802, Akedo et al.

***Regarding claim 1***

Applicant's independent claim 1 requires a composite structure made of at least one of a brittle ceramic and a brittle metalloid formed on a substrate surface, wherein the structure is polycrystalline and crystals forming the structure do not substantially exhibit crystal orientation, a boundary layer made of hyaline does not substantially exist on the boundary face between said crystals, and part of the formed structure is an anchor section biting into the substrate surface and wherein elements other than main elements forming the crystals do not segregate on the boundary face of the crystals forming the structure.

Akedo et al disclose a film formed of ultrafine particles of materials such as PZT, titanium dioxide, and Mn-Zn ferrite, which are set forth by Applicant as brittle materials

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(specification, pages 9-10, section 040), (column 11, lines 56-67), that has superior density and achieves a strong bond between the particles and the substrate with the crystal properties of the particles being able to be maintained, (column 2, lines 50-60), meeting the requirements of claim 1.

When the structure recited in the reference is substantially identical to that of the claims, the claimed properties or function are presumed inherent. *MPEP 2112.01*. Because the prior art exemplifies the applicant's claimed composite structure, the claimed physical properties relating to the hyaline boundary layer and that crystals do not segregate on the boundary face of the crystals forming the structure are inherently present in the prior art. Absent an evidentiary showing to the contrary, the addition of the claimed physical properties to the claim language fails to provide patentable distinction over the prior art over the prior art of record.

*Regarding claim 73*

Applicant's independent claim 73 requires a composite structure made of at least one of a brittle ceramic and a brittle metalloid formed on a substrate surface, wherein the structure is polycrystalline and crystals forming the structure do not substantially exhibit crystal orientation, a boundary layer made of hyaline does not substantially exist on the boundary face between said crystals, and part of the formed structure is an anchor section biting into the substrate surface and wherein the average crystallite size of the formed structure is 50 nm or less and the compactness thereof is 99% or more.

Akedo et al disclose a film formed of ultrafine particles of materials such as PZT, titanium dioxide, and Mn-Zn ferrite, which are set forth by Applicant as brittle materials (specification, pages 9-10, section 040), (column 11, lines 56-67), that has superior density and

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achieves a strong bond between the particles and the substrate with the crystal properties of the particles being able to be maintained, (column 2, lines 50-60). The particle (crystallite) size ranges from 10 nm - 5  $\mu$ m, (column 2, line 50), with the film having a density (compactness) of not less than 95%, (column 13, claim 1), meeting the requirements of claim 73

Because the prior art exemplifies the applicant's claimed composite structure, the claimed physical property relating to the hyaline boundary layer is inherently present in the prior art. *MPEP 2112.01.*

*Regarding claims 2-5 and 74,*

The film can be formed without the need for heat, (column 12, lines 59-65), meeting the requirements of claims 2 and 74. The particle (crystallite) size ranges from 10 nm - 5  $\mu$ m, (column 2, line 50), with the film having a density (compactness) of not less than 95%, (column 13, claim 1), meeting the requirements of claims 3-5.

*Regarding claims 10 and 78*

Material such as metal and ceramics are used for the substrate, (column 12, lines 4-10), meeting the requirements of claims 10 and 78.

7. Claims 1-4, 10, 73-74 and 78 are rejected under 35 U.S.C. 102(e) as being anticipated by United States Patent no. 6,531,187, Akedo '187.

Regarding claim 1

Applicant's independent claim 1 is discussed above.

Akedo '187 discloses an ultrafine particle film wherein the particles are anchored to the substrate to form an underlying layer, (column 3, lines 47-52). PZT and titanium dioxide are examples of materials used for the particles, which are set forth by Applicant as brittle materials

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(specification, pages 9-10, section 040), (column 3, lines 38-43). The deposited film has a polycrystalline structure with crystallites ranging in size from 0.1-0.5  $\mu\text{m}$ , (column 5, lines 47-58), meeting the requirements of claim 1.

Because the prior art exemplifies the applicant's claimed composite structure, the claimed physical properties relating to the hyaline boundary layer and that crystals do not segregate on the boundary face of the crystals forming the structure are inherently present in the prior art. *MPEP 2112.01.*

*Regarding claim 73*

Applicant's independent claim 73 is discussed above.

Akedo '187 discloses an ultrafine particle film wherein the particles are anchored to the substrate to form an underlying layer, (column 3, lines 47-52). PZT and titanium dioxide are examples of materials used for the particles, which are set forth by Applicant as brittle materials (specification, pages 9-10, section 040), (column 3, lines 38-43). The deposited film has crystallite structures ranging in size from 0.1-0.5  $\mu\text{m}$ , (column 5, lines 47-58), with the density (compactness) of the film being 97%, (column 6, lines 16-29), meeting the requirements of claim 73.

Because the prior art exemplifies the applicant's claimed composite structure, the claimed physical property relating to the hyaline boundary layer is inherently present in the prior art. *MPEP 2112.01.*

*Regarding claims 2-4 and 74*

Heat is not needed for the formation of the film, (column 1, lines 52-57), meeting the requirements of claims 2 and 74. The deposited film has crystallite structures ranging in size

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from 0.1-0.5  $\mu\text{m}$ , (column 5, lines 47-58), with the density (compactness) of the film being 97%, (column 6, lines 16-29), meeting the requirements of claims 3-4.

*Regarding claims 10 and 78*

The substrate can be made of materials such as silicon or stainless steel, (column 3, lines 42-43), meeting the requirements of claims 10 and 78.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

*(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.*

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 8-9 and 75-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent no. 6,280,802, Akedo et al as applied to claims 1 and 73 above.

Akedo et al disclose the limitations of claim 1 as set forth above. In addition, Akedo et al also disclose that if the particles to be deposited are oxide materials using air, oxygen, or other



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oxidizing agent, the oxygen deficiency in the oxides during deposition can be controlled, (column 5, lines 1-8). Akedo et al do not specifically disclose the aspect ratio of the crystals or that there is a non-stoichiometric deficiency.

Because Akedo et al disclose that the oxygen deficiency of the deposited film can be controlled, it would be within the skill of one in the art at the time of invention to modify the amount of oxygen in the in order to generate a film with improved characteristics and functionality, (columns 12-13, lines 59-5). It would further be within the skill of one in the art at the time of invention to modify the size of the particle and thus the aspect ratio in order to have a particle size which is not fused or decomposed thereby forming a thin film with superior density and adhesion, (column 2, lines 50-55).

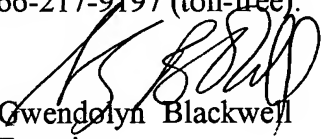
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gwendolyn Blackwell whose telephone number is (571) 272-1533. The examiner can normally be reached on Monday - Thursday; 5:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Gwendolyn Blackwell  
Examiner

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DEBORAH JONES  
SUPERVISORY PATENT EXAMINER

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